Columba palumbus. Wood-Pigeon.

San Cristobal.—On March 21st flocks were seen among the ilex and the lower pinsapos, but our observations during the April visit being confined to higher elevations on this side of the mountain, we did not notice whether they remained to breed. (They nested abundantly in the Coto Doñana.)

Sierra Nevada.—Not seen.

Streptopelia turtur. Turtle-Dove.

San Cristobal.—On April 24th at 11 A.M. six migrant Turtle-Doves were resting on an esparto-grass plateau at 4000 ft.

Sierra Nevada.—Not seen.

Caccabis rufa. Red-legged Partridge.

For the complete status up to date of the Red-legged Partridge in these parts the reader should refer to 'Unexplored Spain.' The Sierra is not the true home of the species in Andalucia, and yet two pairs were seen right up among the mists and snow of the Sierra Nevada at 8500 ft., and another at the summit of the Dornajo, 7000 ft.

In San Cristobal the Red-legged Partridge was not observed above 3000 ft.

XXIV.—*Observations on the Genus* Cœreba, *together with an Annotated List of the Species.* By Percy R. Lowe, B.A., M.B., M.B.O.U.

(Plates VII. & VIII.)

I. Introductory Remarks.

The following observations are based upon the examination of some *four hundred* examples of the genus in the National Collection at South Kensington; upon *a hundred and fourteen* in my own collection; and upon *two hundred and eighty-four* in the Hon. Walter Rothschild's collection at Tring, which he was kind enough to place at my disposal.

The genus *Cœreba* (one of the typical genera of the family

Cœrebidæ) is in point of distribution entirely confined to the Neotropical Region (see Map, Pl. VII.). Its range in this region is fairly comprehensive, being comprised, as regards the continent, within the vast extent of forest-clad land which lies between the latitudes of 20° N. and (roughly) 30° S., and embracing (with a few exceptions to be presently mentioned) the whole of the West Indian Islands.

In the Bahamas the genus attains its furthest northern limits (lat. 27° N.), an extension rendered possible by the warm waters of the Gulf Stream, which bathe these low-lying coral-islands. A small colony has also been reported from Indian Key on the west coast of Southern Florida, which may have been derived from wind-blown stragglers from the Bahamas.

Excluding these last, the present existence of which is possibly doubtful, I have been unable to discover any records of the occurrence of the genus on the continent further north than Jalapa and Vera Cruz on the eastern shores of Southern Mexico (lat. 20° N.).

From these latitudes the northern limits of the genus are represented by a line which skirts the northern boundaries of Guatemala and then pssses eastwards to Jamaica in a curve which includes the islands of Cozumel and the Caymans. From Jamaica the line is again continued eastwards and northwards through the Windward passage so as to include the Bahama Group.

Neither Yucatan, nor British Honduras, nor Cuba are included within the limits of the northern range of the genus. Whether Honduras proper is likewise outside these limits I have been unable to ascertain; but although there are no available records of the occurrence of the genus in that country, it would be altogether surprising to find no species of it represented in at least its more western parts.

The southern limits of the genus, so far as present records go, are represented by a line which passes along the southern borders of Peru and Bolivia and then southwards and eastwards to strike the eastern coast of South America to the south of the province of Rio Grande do Sul in Brazil.

Whether Paraguay should be included within these southern limits it is impossible to say, but the records are so far negative.

Contained within the limits of this vast area, the genus is commonly and universally distributed wherever the immediate local conditions are favourable. Moreover, as regards station, the representative species of the genus seem equally at home, both on coral-islands, such as the Bahamas and the Caymans, at virtual sea-level, or on forest-clad mountainous heights which attain to an elevation of as much as 9000 feet in the Peruvian Andes.

In addition, however, to the exceptions already referred to in the case of Yucatan, British Honduras, and Cuba, the genus is not represented in the Galapagos or in the following small Caribbean Islands: viz., Blanquilla, the Hermanos Group, Islas de Aves, and Orchilla (Leeward Islands, Venezuela), or in Swan Island, which lies some hundred miles to the north of Honduras.

The absence of any species from the smaller islands just mentioned, whether owing to adverse local conditions or to distance and isolation from the mainland, is not very surprising; but to the very interesting subject of the absence of any species from Cuba we shall return.

To anyone studying the many species which characterize the genus *Cœreba* there are certain outstanding features which can hardly fail to be apparent. They may be enumerated as follows :—

(1) The striking contrast in mere depth of coloration which characterizes insular species as compared with those inhabiting the mainland. (*C. luteola* and *C. guianensis*, which are found along the northern limits of South America, are, however, exceptions to this statement.)

(2) The contrast in depth of coloration between the pileum and mantle characterizing all continental species (except the two species just mentioned) as compared with some uniform shade of black seen in these parts in all insular species.

(3) The relatively small amount of variation met with in

continental species and the equally remarkable amount of variation in insular forms. In no point is this more obvious than in the very slight amount of variation in the depth of coloration of the grey throat-patch in continental species, although they may be separated by thousands of miles. As regards insular species, there is probably no genus in the world which is marked by such numerous island forms presenting such striking and such very constant specific differences; and this in spite of the fact that on most of the islands the local conditions are remarkably similar.

(4) The division which can be made of all the species, whether continental or Antillean, into two well-defined groups :—

(*a*) With a definite white wing-spot.

(*b*) Without any wing-spot.

(5) The restriction of these two races to certain very definite tracts or regions which are not scattered in a haphazard way, but in each case are more or less continuous and belong to certain definite and distinct geological systems.

Thus the distribution of the two races seems to faithfully conform to or reflect what we know of the past geological epochs of elevation or depression which have affected the areas to which they are confined. A reference to the accompanying sketch-map (Plate VII.) will perhaps make our point clearer.

In this map the area of distribution of the *race with wing-spots* is indicated by diagonal lines; whereas that of the *race without wing-spots* is indicated by a fine dot tint. To accentuate the different origin of the two races, the inset map representing South America only, is drawn so as to picture in a rough way the distribution of land-areas in early and middle Tertiary times. By this means the geological differentiation of the areas now inhabited by the two races may be more easily realised at a glance. Confining, then, for the moment our attention to the southern continent, we see that the *white-wing-spotted race* (represented

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by the species inhabiting Peru, Ecuador, Columbia, and Venezuela) is definitely restricted to a long mountain system (the Andes), together with its easterly extension as the Sierras of Merida and the cordilleras of Venezuela; and this system of mountains has only become elevated to any considerable heights since late Miocene or early Pliocene times. On the other hand, we find the *race without any wing-spots* is definitely restricted to all that vast area of land which lies to the eastward of the continent and which is now known as Brazil and the Guianas.

Two well-differentiated species now inhabit these last two areas—viz., *C. chloropyga* and *C. guianensis*; and their original centres of distribution correspond with two well-defined land-areas, which in middle Tertiary days were insular and separated from each other and from the low Andean chain by long inland extensions of the sea, as shown in the inset map.

Thus, on the one hand, we have a very ancient land-mass, represented to-day by the denuded Archæan and Palæozoic rocks forming the central uplands and mountainous coast-regions of Brazil (the home of *C. chloropyga*); while, on the other hand, we have another insular mass of Archæan mountains, comprising to-day the more elevated parts of Guiana and the Sierras of Pacaraima, Roraima, and others, which are now the topotypical home of *C. guianensis*.

Both these insular land-masses and the long Andean chain have (geologically speaking) only recently been linked up by the filling of the intervening seas with alluvial deposits, plus the effects of the general elevation of the continent. Thus they have remained sufficiently isolated and distinct in physical characteristics, even up to recent geological times, to give origin to the two races under consideration.

Turning now to Central America and the Antilles, we find the *white-wing-spotted race* still restricted to the long mountainous system which is continued through the Central American States as a more or less direct (if only physical and not geological) prolongation of the Andes. We can, moreover, trace this mountain system eastwards by way

of the now sunken Honduran banks to Jamaica, and thence throughout the long and now disconnected ranges which traverse Haiti, Puerto Rico, and the Virgin Islands; and still we find it occupied by the same subdivision of the genus. From the Virgins the progress southwards into the Lesser Antilles of the white-wing-spotted race was stayed by the deep oceanic passage known as the Anegada Channel.

Lastly, there is a small northerly extension of the *white-wing-spotted race* (represented by *C. saccharina*) from the eastern extremities of the Venezuela cordilleras, and this race inhabits the inner ring of the Lesser Antilles as far north as St. Vincent. And as shewing how apparently unimportant details conform to what we know of past geological periods of land-elevation, it is to be noted that the arrangement of the white spots on the lateral tail-feathers of *C. saccharina* is identical with that seen in typical specimens of *C. luteola*: pointing to the conclusion that *C. saccharina* is merely an offset of the white-wing-spotted race inhabiting the mountainous chains of Venezuela *. Thus in the study of two apparently trifling characteristics in *C. saccharina* (viz., the white wing-spots and the arrangement of the white patches on the tail-feathers) we seem to have presented to us yet another link in the chain of evidence relative to the former connection of the Lesser Antilles with the continent by means of an elevated causeway (in early Pliocene and Pleistocene days).

As regards the rest of the Lesser Antillean islands, we find these occupied by the *race without wing-spots*; and in conformity with what is known of former land-extensions affecting the north-easterly parts of the continent, we may presume that this race without white wing-spots, which now

* It is interesting to note that an elevation of the Grenada bank to the extent of forty fathoms would produce an island nearly 100 miles in length; also as confirming the above remarks upon *C. saccharina* that Mr. Thomas Bland has called attention to the fact that the genera and species of land molluscs which occur in the islands of St. Vincent, the Grenadines, and Grenada, are mostly allied to those which are characteristic of Venezuela (Proc. Amer. Phil. Soc. Philad. vol. xii. p. 56, 1871).—P. R. L.

inhabits the more northerly of the Lesser Antilles, represents a northerly extension of the Brazilian race (*C. chloropygia*). Probably it spread northwards along elevated land-areas to the east of the ancient course of the Orinoco, a supposition which is prompted by what we know in regard to the land-shells of the more northern Lesser Antilles, and the remains of large Pleistocene animals found in the phosphate deposits of Anguilla (see Cope).

Thus, regarded in the light of work done in relation to the past geological history of the West Indies, Central and South America (Gregory, Agassiz, Spencer, &c.), it is impossible to regard these two races which characterize the genus as anything but quite distinct; and to recognize such subspecies as *C. chloropygia luteola* (*cf.* Ridgway, 'Birds of North and Middle America,' pt. ii. p. 408 footnote) and *C. chloropygia mexicana* (*cf.* Hellmayr, "Contribution to Ornithology of Western Columbia," Proc. Zool. Soc. London, 1911, p. 1098), which combine representatives of both races, appears to me to be scientifically indefensible, or at least inadvisable.

(6) Species from the Greater Antilles have both webs of the lateral tail-feathers broadly and nearly equally tipped with white; while in South-American and Lesser Antillean forms this white is more restricted on the inner web and is reduced on the outer to the merest border.

It is to be noted, however, that *C. bananivora* from Haiti is an exception to this rule, for it conforms to the continental arrangement, and the same remark also applies to *C. saccharina*, as we have just seen.

(7) The remarkable absence of any representative of the genus from the island of Cuba and, having in view the nature of the two countries, the less notable absence from Yucatan and British Honduras.

(8) The very interesting occurrence of melanic forms in the islands of St. Vincent, Grenada, Los Testigos, and Los Roques.

(9) The remarkable effect that the mere isolation furnished by the West Indian Islands has had in fostering the

development of variations on the two types, which, we may presume, originated on the South-American continent. Do away with the islands, and we should be left (if we ignore subspecific differences) with some four species to characterize the genus.

(10) The fact, perhaps less prominent than others, that at the extreme northern limits of the genus (the Bahamas) and again at the extreme southern (Peru and the province of Rio Grande do Sul, Brazil) the tendency is to produce species in which the individuals are characterized by larger measurements than the rest and also by a more pallid coloration.

Absence of representatives from Cuba, Yucatan, and British Honduras.—The fact that no species of *Cœreba* inhabits Cuba, and that not even stragglers, so far as I am aware, have been recorded from that island, is an ornithological problem of very peculiar interest. I have landed at some dozen widely-separated localities, on the northern and southern coasts of the island, where the local conditions seem to differ in no obvious way whatever from those met with in other islands where the genus is found, and yet have never seen so much as a solitary straggler.

From one's personal experience of the nature of the surroundings, it seems impossible to believe that the Flora can be in any way responsible for this absence. Moreover, Dr. Rendle informs me that although the Flora of Cuba is different in many respects from that of the rest of the Greater Antillean islands, yet that such differences in his opinion would be too insignificant to have any influence on the subject in question.

Climatic conditions might well have a more potent effect, for in the winter months "northers" are frequent, and the fall in temperature may be very marked. In this respect Cuba appears to me to fall into the same category as the more northern parts of Eastern Mexico and also of Florida. Thus while the Flora of Cuba might remain almost identical with that of other Greater Antillean islands (for we know

that closely-allied species of the vegetable world may live under very different climatic conditions), yet these constantly recurring cold snaps in winter might be enough to explain the absence of the genus.

Failing climatic conditions as an explanation, we may look to the absence of species of the genus from Yucatan and British Honduras as a possible clue. The physical conditions in these two countries are all against the existence of any representative species. In British Honduras there is only a very narrow belt of fertile country between the wide coastal fringe of mangrove-swamps and the arid hills inland, which are covered with "pine" forests; while as regards the peninsula of Yucatan, the conditions are still more hostile. The country is very flat, very dry, and very hot. The streams run for the most part underground, and the only surface-water is found in peculiar natural wells (cenotes). In consequence the Flora, generally speaking, is of a scrubby order, and in winter many of the trees and bushes assume a much faded and withered condition or entirely lose their leaves—conditions which are adverse to the maintenance of a bird that lives chiefly on insects which frequent the honey-laden flowers of plants and bushes.

Yucatan is, in fact, little more to-day than a very recently upraised coral platform, consisting of weathered coral limestone of a very rough and pitted nature or, in other places, of sheets of a recent shell conglomerate.

These facts, as we have hinted, may furnish the clue to the absence of *Cœreba* from Cuba. For we may conclude that while these Pliocene and Pleistocene coral formations and conglomerates were being laid down beneath the sea, Cuba was very much more isolated than it is now. Indeed, it was not only further isolated from Central America, but also from Northern America by reason of the fact that at some part of these periods Florida was likewise in a state of submergence.

Consequently, if during one of the latest periods of West Indian elevation in either Pliocene or Pleistocene times

the Honduratin banks formed a chain of very closely connected islands *, permitting the immigration of the original Greater Antillean stock of the genus from Central America to Jamaica, we can perhaps conceive that this line of emigration would have missed Cuba altogether, and have pushed eastwards in the direction of the peninsula of Jacmel in Haiti, and from thence onwards through Puerto Rico to the Virgin Islands.

It may be objected that the distance between Jamaica and Haiti from Cuba is so slight that such a proposition seems unlikely. But in answer to this it must be stated that the species comprising the genus *Cœreba* are peculiarly sedentary, and that there is little or no evidence that they have ever extended their range by any other means than land-bridges. Moreover, it must be remembered that between Jamaica and Haiti on the one hand and Cuba on the other there stretched Bartlett's Deep and the Windward passage. In all probability this stretch of deep water would have formed a formidable barrier to the passage of such a sedentary race in even the greatest periods of elevation of which we have any evidence in the West Indies.

But whatever the possible explanation may be, we may feel fairly certain, bearing in mind the great depression obtaining in Central America and the West Indies in Miocene times, that no extension of the genus from the continent to the Greater or Lesser Antilles took place before the early Pliocene elevation and possibly not before the Pleistocene.

II. Annotated List of the Species of the Genus *Cœreba*.

Cœreba Vieillot, Hist. Nat. Ois. Amér. Sept. 1807, tom. ii. p. 70. (Type, *Certhia flaveola* Linn.)

Certhiola Sundevall, (Efv. Vet.-Ak. Handl. Stockholm, 1835, p. 99.

* The Pedro bank, within fifty miles of Jamaica, after an elevation of from 30 to 40 fathoms, would give an island 100 miles long, 30 miles in breadth near its centre, and 45 miles at its western edge.

Cœreba mexicana.

Certhiola mexicana Sclater, Proc. Zool. Soc. Lond. 1856, p. 286 (S. Mexico).

Cœreba mexicana Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 409 [Southern Mexico (States of Vera Cruz, Oaxaca, &c.) through Central America and Pacific coast of northern South America to Ecuador].

Specimens examined. Ten from Mexico, six from Nicaragua, fourteen from Guatemala, eight from Costa Rica, five from Panama.

Hab. Southern lowlands and southern coast-districts of Mexico; Guatemala; Nicaragua; Costa Rica and Panama (Chiriqui and Veragua).

In this continental form the upper parts are characterized by a striking contrast between the colour of the pileum and that of the mantle and scapulars. This is characteristic of all Central and South American species of the genus with the exception of two species (*C. luteola* and *C. guianensis*) found in the north of South America and the races which inhabit Gorgona Island (west coast of Columbia) and San Miguel Island in the Bay of Panama.

This contrast is visible at a glance, and, with the exceptions just mentioned, serves to easily distinguish a continental example of the genus from a West Indian one, in which the upper parts (rump excepted) are uniformly (or very nearly so) coloured black or some dark shade of it.

In *C. mexicana* the pileum is sooty blackish or brownish black; the hind-neck, mantle, and scapulars are uniform greyish olive or olive-grey; the rump is yellowish olive-green, and the under parts a uniform and pale greenish yellow.

So far as I can deduce from the material at hand, this species would appear to extend from its northern limits in Southern Mexico through the Central American States indicated above, as far as the Isthmus of Panama, where it meets and merges with a slightly differentiated race (*C. mexicana columbiana*), characterized by possessing an olive-yellow rump as compared with an olive-green one, and also by a slightly larger wing-spot and by being a slightly

larger bird. As in all wing-spotted continental species (except *C. luteola*), the wing-spot in *C. mexicana* is a variable quantity, and is nothing like so conspicuous as in the insular races of the Greater Antilles. In *C. mexicana* and its allies it is sometimes liable to be nearly concealed by the primary wing-coverts. In six examples from Nicaragua it was hardly visible. It is worthy of note that although several large collections of birds have been made in Yucatan, none contained any species of the genus *Cœreba*, so that we may conclude that the genus is not represented there. I have also been unsuccessful in finding any record of a representative from British Honduras or Honduras proper. As regards British Honduras, the nature of the country is such as to cause no surprise at the absence of any species of the genus, the Flora generally being quite unsuitable, but the conspicuous absence of all records from Honduras proper seems very curious. While on the eastern coast of Mexico at Tampico and also further south at Coatzacoalcos I failed to secure or to see a single specimen of *C. mexicana*, although my excursions in search of birds took me in all directions to distances of more than twenty miles from both these localities. This was in the early spring, during three consecutive yearly visits.

Cœreba mexicana columbiana.

Certhiola columbiana Cabanis, Journ. für Orn. xiii. 1865, pp. 412–413 (Bogotá).

Certhiola mexicana columbiana Berlepsch, Journ. für Orn. xxxii. 1884, p. 276 (Bucaramanga); Ridgway, Proc. U.S. Nat. Mus. viii. p. 276.

Cereba mexicana columbiana Cory, Auk, viii., Jan. 1891, p. 41.

Cereba chloropyga mexicana Hellmayr, Proc. Zool. Soc. 1911, p. 1098.

Hab. Columbia, extending into Panama.

Specimens examined:—

Eleven specimens from Columbia. Coll. Brit. Mus.

Nine native skins from Bogotá. Coll. Rothschild.

Ten specimens from Panama. Brit. Mus.

Seven specimens from Panama. Coll. Rothschild.

This subspecies of *C. mexicana* differs from typical specimens in possessing an olive-yellow rump-patch as compared with olive-green in Mexican examples, and in having the mantle ashy brown instead of olive-grey. The wing-spots in specimens from Bogotá tend to be somewhat larger and the yellow of the under parts somewhat richer (olive-yellow as compared with greenish yellow—chlorotic).

In my opinion, with the material available, there seems to be little doubt about the constancy of the distinctly more yellowish coloration of the rump in typical specimens from Columbia.

Ten examples from Panama in the British Museum Collection also exhibit it, but specimens from Chiriqui and Veragua (coll. Rothschild) agree with specimens from Vera Cruz (typical *C. mexicana*), from which it would seem probable that the two races meet or intermingle somewhere about the line of the Panama Canal.

Two specimens labelled "Juntas (Western Columbia)" in the Tring Collection seem to be undoubtedly examples of *C. luteola*.

Mr. Hellmayr (*l. c.*) has recently determined the West Columbian form as a subspecies of *C. chloropygia*. I have already noted, in the introductory remarks to this paper, the objections to such a proceeding, for *C. chloropygia* belongs to a distinct group characterized by the absence of a white wing-spot, and which, moreover, is restricted to land-areas having quite a distinct geological history.

Cœreba mexicana intermedia.

Certhiola intermedia Salvadori & Festa, Boll. Mus. Zool. Torino, xv. no. 357, 1899, p. 13; Ridgway, Birds N. & M. Amer. pt. ii. p. 407 (footnote, synonymy).

Type locality. Valley of Zamora, Gualaquiza, Ecuador.

Hab. Ecuador.

Specimens examined. Twenty-eight.

The specimens which I have examined from all parts of

Ecuador—Gualaquiza, Esmeraldas, Zamora, Santa Rosa, Nanegal (coast districts), Quito, Intaj, Sarayacu (mountains); and whether from the eastern or western slopes of the Andean system—all agree in being darker and more richly coloured than specimens from Mexico. Thus the upper parts exhibit a darker and browner tint than in *C. mexicana* (olive-grey), the pileum is not so strongly contrasted with the mantle, and the rump is yellow with a faint olive tinge, and even brighter than in *C. columbiana*. The yellow of the under parts is also strikingly richer and deeper, with a tinge of ochraceous in some seven or eight specimens in the British Museum.

The wings of Ecuador birds average 58·9 mm. as compared with 55·5 in Mexican birds. As regards the ashy grey of the throat-patch, I cannot distinguish any noticeable difference.

Some specimens of *C. m. intermedia* come very close to topotypical examples of *C. m. columbiana*, but, generally speaking, Ecuadorian specimens are darker and richer both above and below, and the yellow of the rump-patch is distinctly brighter.

It may be added that *C. intermedia* was originally described by Salvadori and Festa as intermediate between *C. columbiana* Cab. and *C. magnirostris* Tacz.

Goodfellow ("Ornithological Journey through Colombia and Ecuador," Ibis, 1901, p. 319) states that "birds from Western and Eastern Ecuador do not vary." In July he found a nest with two eggs at Intaj.

Cœreba magnirostris.

Certhiola flaveola Tschudi (nec Linn.), Fauna Peruviana, Ornith. 1845, p. 236.

Certhiola peruviana Taczanowski (nec Cabanis), Proc. Zool. Soc. 1874, p. 512 (Paltaypampa).

Certhiola magnirostris Taczanowski, Proc. Zool. Soc. 1879, p. 225.

Hab. Central Andean chain of mountains, Peru; also eastern slopes (Cajabamba, Vina Maranon, Chimabamya, Callacate, Huamachuco, Guajango).

Six specimens examined. Coll. Brit. Mus.
Four „ „ Coll. Rothschild.

This fine mountain-form from Peru is at once distinguishable from *C. intermedia* by its much longer bill and wings, by the pale ashy brown of the mantle, in marked contrast with the darker brown of the pileum, by the yellowish olive-green of the rump, and the pale chlorotic yellow of the under parts. In point of size and general appearance its nearest ally is *C. c. majuscula*, from Southern Brazil, but it can be at once distinguished from that subspecies of *C. chloropyga* by its white wing-spot and much longer and stouter bill.

It is found in the central Andean chain of mountains, and also on its eastern slopes, at an elevation of from 5000 feet to 9000 feet.

Taczanowski says (*l. c.*) that the wing-measurement = 64 mm., and that the bill = 19 mm.; I find that of the specimens in the British Museum the largest wing-measurement is 63 mm. and the largest bill (*exposed culmen*) is 16 mm.

In *C. mexicana* (topotypical specimens) the wings of six specimens averaged 55·5 mm., while the exposed culmen was 10–11 mm.

A nest described by Taczanowski from Paltaypampa (5500 feet) in Central Peru (P. Z. S. 1874, p. 512), and discovered on May 19th, 1872, was constructed of large blades of grass and of long branched stalks of moss mingled with vegetable down.

In my description of the next species, *C. pacifica*, I have stated my reasons for sinking Cabanis' name *C. peruviana*.

Cœreba pacifica.

Cœreba pacifica Lowe, Bull. B. O. C. vol. xxix. p. 85 (1912).

Hab. Pacific coast of Peru (Pacasmayo, Chepen, Chimboté and Eten).

Type. In Coll. Brit. Mus., Pacasmayo.

Measurements. Exposed culmen 10 mm.; wing 56 mm.; tarsus 16 mm.

Differs from *C. magnirostris*, its Andean ally, in being a smaller bird with smaller wings and much smaller and more curved bill. The coloration in the two species is nearly identical. In *C. pacifica* the bills are also smaller than in *C. mexicana*, and the bird is paler above and below.

There are only four specimens of this Pacific sea-board race in the British Museum; but I have examined two others from coast localities in the Tring collection which exactly agree with it.

I at first thought this form might be Cabanis' *C. peruviana* (J. f. O. 1865, p. 413); but Cabanis' description agrees more closely with that of *C. magnirostris* of Taczanowski; for he says his specimen (a somewhat imperfect one obtained by the traveller Warscewicz) is almost identical in size and coloration with *C. majuscula*. The latter is very similar to *C. magnirostris*, but lacks the wing-spot and is altogether larger than *C. pacifica*.

Moreover, Cabanis' gives no measurements and says that "the exact locality is missing, probably it is in Eastern Peru, and thus the bird is identical with one referred to by Von Tschudi."

Tschudi's *C. flaveola* was presumably described from the *eastern* slopes of the Peruvian Andes, which is the home of *C. magnirostris*, and of which I consider it a synonym.

In addition to this, Dr. Reichenow informs me that the type of *C. peruviana* is missing.

Consequently, with so much uncertainty attaching to the name which Cabanis gave to his Peruvian bird I think it would be better, instead of regarding it as identical with *C. magnirostris*, over which it would have priority, to sink Cabanis' name altogether.

Cœreba chloropyga.

Certhiola chloropyga Cab. Mus. Hein. i. 1851, p. 97 (Bahia, Brazil); Sclater, Cat. Birds Brit. Mus. vol. xi. p. 44.

Hab. Eastern Brazil (Bahia; Pará district; Pernambuco:

Maranhao; Rio Janeiro and Minas Geraes, as far south as about the latitude of S. Paulo).

Specimens examined. Twelve adult males and females from type locality (Bahia); eleven from Pará: nine from Pernambuco, Rio Janeiro, and Minas Geraes.

Measurements. Wings of Bahia specimens = 59–60 mm.

Topotypical specimens have the mantle ashy brown, the pileum brownish black, wings dark brown narrowly edged with lighter, rump olive yellowish, tail-feathers dark brown, throat-patch ashy grey; no wing-spot; yellow of under parts clear saffron-yellow.

Birds from Rio Janeiro and that district come so close to typical specimens that they cannot be separated, yet if anything the upper parts are lighter and olive-brown instead of ashy brown.

Specimens from Para seem to be inseparable from Bahia specimens.

With the material available I cannot separate Bolivian specimens from true *C. chloropyga*.

Cœreba chloropyga majuscula. (Pl. VIII. fig. 1.)

Certhiola majuscula Cab. Journ. für Orn. 1865, p. 413.

Hab. Rio Grande do Sul (Guaratingetá), Parana and S. Paulo.

Specimens examined. One adult from Guaratingetá (type Coll. Mus. Berlin), two adults from Pelotas (Coll. Brit. Mus.), and two from S. Paulo (Coll. Rothschild).

This southern form of *C. chloropyga*, of which Dr. Reichenow has very kindly allowed me to see the type, differs from typical *C. chloropyga* in being somewhat paler and distinctly larger. There is no wing-spot.

In the type specimen the measurements are as follows:— Exposed culmen 12 mm.; wing 63 mm.; tail 37 mm. The two specimens from Rio Grande do Sul are 62 mm. and 63 mm. respectively, while in one from S. Paulo the wing is 62 mm. (other ? ♀).

In five adult typical specimens from Bahia the wings average 60 mm.

Cœreba chloropyga alleni.

Cœreba chloropyga alleni Lowe, Bull. B. O. C. vol. xxix. p. 86 (1912).

Certhiola chloropyga Allen, Bull. Amer. Mus. N. H. vol. iii. 1890–91, p. 348 (Chapada, Matto Grosso).

Type. Coll. Brit. Mus.

Hab. Chapada district, Matto Grosso, Brazil.

Measurements. Wings average 58 mm.

Seven adults (males and females) differ from typical specimens from Bahia in being distinctly paler above and below and in having the pileum barely differentiated from that of the mantle.

Thus the pileum, mantle, and scapulars are pale olive-brown or brownish olive (wings and tail darker brown), the rump is yellowish olive-green, and the yellow of the under parts is pale citron as compared with saffron-yellow. There is no white wing-spot, and the colour of the throat-patch is ashy white as compared with greyish in typical *C. c. chloropyga*. As compared with *C. c. majuscula* this race is smaller and paler.

Cœreba chloropyga cayennensis, subsp. nov.

Cœreba chloropyga Hellmayr, Nov. Zool. vol. xv. p. 112.

Type. E. Mus. O. S. in coll. Brit. Mus., Oyapoc, Cayenne.

Hab. Dutch and French Guiana (lowlands).

Twelve adult specimens examined.

It is impossible to ignore the fact that examples from the Cayenne and Surinam coast-belts differ from typical specimens of *C. chloropyga* from Bahia. They appear to be intermediate in coloration between examples from British Guiana (*C. guianensis*) and typical *C. chloropyga* (*cf.* also Hellmayr, *l. c.*). In case, therefore, it is thought advisable to distinguish this geographical race by a distinctive name, I propose that of *Cœreba chloropyga cayennensis*.

In the specimens which I have examined from the above localities the pileum is sooty black as compared with brownish black in birds from Bahia, the colour of the mantle and scapulars is darker ashy brown, and the rump is distinctly more yellow. There is no wing-spot.

Cœreba guianensis.

Certhiola guianensis Cab. Mus. Hein. i. p. 97 (1851); Sclater, Cat. Am. Birds, 1862, p. 53.

Cereba guianensis Berlepsch & Hartert, Nov. Zool. vol. ix. p. 17 (1902).

Cereba guianensis Hellmayr, Nov. Zool. vol. xii. p. 272 (1905).

Hab. Highlands of British Guiana (Roraima, Bartica Grove, Merumé Mts., Camacusa); North Brazil, Upper Rio Negro (Marabitanas, Cobati); South Venezuela, Rio Suapure, Rio Caura.

Specimens examined. Seventeen adult males and females from British Guiana (Coll. Brit. Mus.), and twelve from Rivers Suapure and Caura, Venezuela (Coll. Rothschildi).

This is a very distinct species and any series from the above-mentioned localities is recognizable at the merest glance from typical *C. chloropyga* with which one might have expected it to be closely allied.

Upper parts. Pileum pure black; mantle, neck, and scapulars dark brownish black, barely distinguishable from pileum and totally distinct from the ashy-brown mantle of *C. chloropyga*; rump with a very conspicuous broad band of bright and pure yellow, but not so rich as in *C. luteola*; no wing-spot.

Under parts. The yellow of these is deeper and richer than in true *C. luteola* and very similar, if not identical, with that seen in Trinidad birds. Throat-patch nearly identical with that of true *C. luteola* and *C. chloropyga*.

To sum up, *C. guianensis* is practically similar to *C. luteola*, but is without any wing-spot.

A glance at a map will shew that the distribution of this species corresponds to a well-defined and more or less isolated geological area characterized by a system of rocks of extreme antiquity—an area, be it said, which at no remote period of time probably stood out as a prominent insular mass.

Cœreba luteola major. (Pl. VIII. fig. 2.)

Certhiola luteola Cab. Mus. Hein. i. 1850, p. 96 (Puerto Cabello and Cumaná, Venezuela; Cartagena, Columbia; Coll. Berlin Mus.).

Certhiola major Cab. Mus. Hein. i. 1850, p. 96.

Hab. Caribbean coast district of Columbia and Venezuela: Margarita Island; Peninsula of Cariaco; Central Venezuela (*e. g.* Altagracias, Ciudad Bolivar), and S. Esteban, Venezuela.

Specimens examined. Sixteen adults in Coll. Brit. Mus.; six in Coll. P. R. L.; ten adults in Coll. Tring.

It may be pointed out that this species was first described from Cumaná and Puerto Cabello, that is from very dry and arid coast districts overgrown with cactus and mimosa scrub. Birds from Margarita Island and the deserts of the Cariaco Peninsula agree with typical birds in their pale coloration as compared with birds taken in the mountainous interior of Venezuela, which are deeper in colour and also have larger measurements.

C. luteola major (Cab. Mus. Hein. i. 1850, p. 96).—Owing to the kindness of Dr. Reichenow I have been enabled to examine the type specimen (ad. ♂ 8164, Guiana, Coll. Schomburgk, Coll. Mus. Berlin) of this very doubtful species.

At the present time the black coloration of the pileum, mantle, and scapulars is tinged with brown; but it must be noted that the bird has been mounted and exposed to the light. The rump-patch is also more olive-yellow and extends further up the back than in typical *C. luteola*, and the yellow of the under parts is richer with a tinge of *olive* as in Trinidad examples of that species. On the other hand, the specimen might equally be regarded as one of *C. guianensis*, but with a wing-spot, or as an intermediate or mongrel example on the boundary-line of the two species.

It is interesting, as bearing on this last statement, to note that Sclater and Salvin (P. Z. S. 1867, p. 570) called attention to a bird from Cobati, Rio Negro, which "shows

a small white wing-spot," and suggest that it might be correctly referable to *C. guianensis*. We may therefore regard the so-called species *C. major* as having probably been founded upon a few mongrel examples obtained on the border-line between the areas of distribution of *C. luteola* and *C. guianensis*, and for this reason it would seem advisable to sink the name altogether or regard it as a synonym of *C. luteola* or *C. guianensis*.

Cœreba luteola montana, subsp. nov.

Type. Ad. ♂, 20.ii.97, Merida (1600 metres), Briceño coll. in Mus. Rothschild., Tring.

Measurements. Bill 14 mm. (exposed culmen); wing 62 mm.; tarsus 16 mm.

I have examined a series of nineteen specimens from the mountainous district of Merida (Western Venezuela) contained in the collection of Mr. Walter Rothschild at Tring. These birds are darker and richer than typical specimens of *C. luteola* (Cumaná) and have the coloration of the rump more *olive* yellowish. They have also obviously larger bills (average 14 mm., as compared with 11 mm. in typical specimens), and the wings are noticeably larger. The throat-patch is dark ashy grey as compared with light ashy in typical *C. luteola*. It is highly probable, therefore, that the birds which inhabit the main mountain-chains of Venezuela are generally larger and more richly coloured than those of the coast district, as I have already pointed out in the case of Trinidad birds ('Ibis,' 1907, p. 566). I have therefore deemed it advisable to distinguish this mountain race from the Merida and possibly other mountain districts by a definite name.

Cœreba luteola hellmayri.

Cœreba luteola trinitatis Lowe, Ibis, Oct. 1907, p. 566.

Cœreba luteola hellmayri Riley, Proc. Biol. Soc. Wash. xxiii. p. 100 (1910).

Hab. Islands of Trinidad and Tobago.

Specimens examined. Nineteen adults from Trinidad in

Coll. Rothschild; ten from Tobago and Trinidad in Coll. P. R. L.

If a fairly large series of birds from these two islands is compared with a similar series from or near the typical locality they are easily seen to be of a deeper and richer coloration, both above and below, and to have larger measurements. The grey of the throat-patch is also darker.

Cœreba cerinoclunis.

Cereba mexicana columbiana Bangs. Auk, xviii. 1901, p. 30 (San Miguel Island, Panama).

Cereba cerinoclunis Bangs, Proc. New Engl. Zool. Club, ii. 1901, p. 52 (San Miguel Island, Panama, Coll. E. A. & O. Bangs); Ridgway, Birds N. & M. Amer. pt. ii. 1902, p. 408.

Hab. Island of San Miguel, Bay of Panama, Columbia.

I have not seen an example of this species. Judging by Mr. Bangs's description the upper parts differ from *C. mexicana* in being sooty black (as in *C. luteola*); the rump is olive-yellow, becoming purer yellow below; there is a large and conspicuous white wing-spot, and the yellow of the under parts is of a bright lemon coloration (*cf.* Ridgw. *l. c.*).

From the description, therefore, it is obvious that this species is quite distinct from *C. mexicana* and rather close to *C. luteola*.

Cœreba gorgonæ.

Cereba gorgonæ Thayer & Bangs. Bull. Mus. Comp. Zool. Harvard, vol. xlvi. p. 97.

Type. Coll. E. A. & O. Bangs. Gorgona Island, 1901.

Wing, ♂ ♂, 55·5–57·5 mm.; culmen 13–13·5 mm.

Hab. Gorgona Island, West Coast of Columbia.

Mr. Bangs says of this species, which I have never seen: "A very distinct species, nearest to *C. cerinoclunis* Bangs, of the Pearl Islands, Bay of Panama. Differs in the much smaller—reduced to a mere dot—white wing-spot, much deeper black back, darker grey throat, darker and more greenish-yellow belly, and in having a greenish band bordering

the grey of the throat below; size about the same; rump-patch olive-yellow. . . . In its dark grey throat and jet-black upper parts it resembles *C. luteola*."

Cœreba flaveola.

[*Certhia*] *flaveola* Linnæus, Syst. Nat. ed. x. i. 1758, p. 119 (based on *Luscinia s. Philomela e fusco et luteo varia* Sloane, Nat. Hist. Jamaica, p. 307, pl. 259. fig. 3).

Nectarinia antillensis Less. Traité d'Ornithologie, 1830, p. 3. Figured, Atlas, pl. 75. fig. 2, but white wing-spot missing.

Cœreba flaveola Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 414.

Hab. Island of Jamaica.

15 ♂♂ & ♀♀. Brit. Mus.

14 ditto. Coll. Rothschild.

4 ♂♂ & 6 ♀♀. Coll. P. R. L.

With this species, which is the type of the genus, we now pass on to consider a series of insular forms inhabiting the Greater and Lesser Antilles, the Bahamas, and a few islands bordering the mainland in the Caribbean basin.

Cœreba bananivora.

Motacilla bananivora Gmelin, Syst. Nat. i. pt. ii. 1788, p. 951 (St. Domingo; based on *Bananiste* Buffon, Hist. Nat. Ois. v. p. 332).

Cœreba bananivora Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 411.

Hab. Island of Haiti (Greater Antilles).

6 ♂♂ & ♀♀. Coll. Brit. Mus.

5 ditto. Coll. Rothschild.

6 ♂♂ & 3 ♀♀. Coll. P. R. L.

It is to be noted that the outer webs of the outermost rectrices in this species do not exhibit any white coloration, in which it conforms to the continental arrangement, and differs from all other Greater Antillean species. The pileum of adult birds is plain black, while the back is somewhat lighter, sooty black, and the loral, suborbital, and auricular regions are plain black as in the pileum (*cf.* Ridgway).

Cœreba portoricensis.

Certhiola portoricensis Bryant, Proc. Bost. Soc. Nat. Hist. x., Jan. 1866, p. 252 (Porto Rico; Coll. U.S. Nat. Mus.).

Cœreba portoricensis Ridgway, Birds N. & M. Amer. pt. ii. 1902, p. 412.

Certhiola sancti thomæ Sundevall, Œfv. K. Vet.-Ak. Förh. Stockh. 1869, p. 621 (St. Thomas).

Hab. Puerto Rico, Vieques, Culebra, St. Thomas, and the Virgin Islands.

32 specimens in Coll. Brit. Mus.

9 ditto in Coll. Rothschild.

8 ♂♂ & 8 ♀♀. Coll. P. R. L.

Examples from Puerto Rico tend to have a deeper shade of yellow on the under parts (yellow-ochre) as compared with those from St. Thomas and the neighbouring Virgin Islands, in which the yellow is lighter and clearer.

The coloration of the upper parts, also, in Puerto Rican examples is pure black, as compared with sooty black in adult specimens from St. Thomas, and the wing-feathers of the latter birds tend to be edged with lighter.

Considering the far more arid conditions which now obtain in St. Thomas, this is what one might have expected; and although Sundevall's name of *sancti-thomæ* was probably founded on immature specimens with the yellow eye-stripe and the greyish-brown backs, I have been tempted to restore his name for the St. Thomas and Virgin Island birds, and to make them a subspecies of *C. portoricensis* from Puerto Rico. The fact, however, that a series of thirteen birds, taken by me in St. Thomas in the month of January, all present a paler appearance on the upper parts than in the case of a series of nine taken by Mr. M. J. Nicoll on the same island in February, causes me to wonder if the paler appearance of St. Thomas Island birds examined by me is not due to a seasonal change; and this opinion is strengthened by the examination of two examples from Virgin Gorda and one from Anegada taken in the months of November and December respectively, in which the

upper parts are paler still than in January specimens from St. Thomas.

Except for their paler throat-patches these Virgin Gorda and Anegada specimens come very near to examples of *C. newtoni* from the island of St. Croix, and they have the same shade of olive-green in the coloration of the rump. Gundlach (J. f. Orn. 1878, p. 179) describes nests and eggs of specimens from Porto Rico. He says the nests can be found all the year round, but very seldom do they contain eggs or young. He thinks that the nests are often used as sleeping-places. On March 15th he found freshly hatched young, and again in the autumn freshly flown young. In December, 1903, on the island of St. Thomas, the late Dr. Bowdler Sharpe and I shot birds in first plumage with yellow eye-stripe and grey of throat mottled with yellowish: the upper parts being hair-brown, with pale edges to wing-feathers and scapulars.

Cœreba newtoni.

[*Certhiola*] *newtoni* Baird, Am. Nat. vii. 1873, p. 611 (St. Croix, Greater Antilles; Coll. U.S. Nat. Mus.).

Cœreba newtoni Ridgway, Birds N. & M. Amer. pt. ii. 1902, p. 416.

Hab. St. Croix, Greater Antilles.

8 adult specimens in Coll. Brit Mus.

In this well-marked species the yellow of the breast is a rich yolk-of-egg colour, and the yellow of the rump-patch is distinctly tinged with olive-green. The white wing-patch is quadrate—that is to say, the outer webs at the bases of the primaries are not involved in the white coloration.

I cannot agree with Prof. Baird that the throat is so dark that it does not present any contrast with the black of the cheeks. The coloration of the throat-patch is almost exactly identical with that seen in *C. bananivora*. It is paler than *C. flaveola*, and darker than in *C. portoricensis*.

The pileum is nearly, if not quite, black; the mantle smoky black or sooty grey; the secondaries have conspicuous light edges.

Thus the upper parts of *C. newtoni* more closely resemble birds from St. Thomas and the Virgin Islands than examples of *C. flaveola*, with which this species is compared by Ridgway (*loc. cit.*). It is to be noted that birds from Puerto Rico do not present the pale edgings to the remiges seen in *C. newtoni* and in birds from St. Thomas and the Virgins.

As regards the breeding-habits of this bird, Newton ('Ibis,' 1859, p. 67) states that "it appears to breed from March to August." He then gives a description of the nest.

Cœreba bahamensis.

Certhiola bahamensis Reichenbach, Handb. i. 1853, p. 253 (based on *Certhia bahamensis* Catesby, Nat. Hist. Carolina, i. pl. 59).

Cœreba bahamensis Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 401.

Hab. Bahama Islands.

32 ♂♂ & ♀♀. Coll. Brit. Mus.

6 ditto. Coll. Rothschild.

2 ♂♂. Coll. P. R. L.

The wings of Bahaman birds average larger (66–63 mm.) than in any other species of the genus except *C. tricolor*, and the colour of the throat-patch is paler, being of the palest ashy white. The arrangement of the yellow coloration of the under parts also enables this species to be easily identified at a glance from all other species. It commences further down over the thoracic region (not at junction of throat and thorax), and ends sooner and more abruptly over the abdomen. It is therefore much more restricted, and the effect produced is that of a centrally disposed band of yellow with well-defined upper and lower borders.

The lower abdomen, crissum, and under tail-coverts are also, in marked contrast with all other species of the genus, ashy white; so that there seems as much of this colour behind the yellow band as in front of it, an arrangement which distinguishes *C. bahamensis* at a glance.

Todd and Worthington (Annals Carnegie Mus. vol. vii. nos. 3–4, 1911) state that the birds of Great Inagua have larger bills than those from the more northern Bahamas [17 mm. as compared with 14·6 mm. (average)]; but the size of those I have examined appear to vary, and in some cases the bills of birds from other islands are as large as those from Great Inagua. It is interesting to note that stragglers from the Bahamas have, or had established themselves on Indian Key, Florida, and have been described as *C. bairdii* (Cabanis, Journ. für Orn. 1865, p. 412).

Cœreba sharpei.

Certhiola sharpei Cory, Auk, iii., Oct. 1886, p. 497.

Cœreba sharpei Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 404.

Hab. Grand Cayman, Little Cayman, and Cayman Brac Islands (south of Cuba).

Wing-measurements of 9 specimens average from 60–62·5 mm.

38 ♂♂ & ♀♀. Coll. Brit. Mus.

8 ditto. Coll. Rothschild.

5 ♂♂, 5 ♀♀. Coll. P. R. L.

In this species the smoky grey of the throat-patch is continued well on to the thorax, being, in this respect, intermediate between *C. bahamensis* and *C. tricolor*. In *C. caboti* the ashy white is nearly confined to the throat.

The bill is larger than in *C. caboti*, and the yellow coloration of the underparts is continued posteriorly as in *C. caboti* and *C. tricolor*.

The light edgings to the wing-feathers are not nearly so pronounced as in *C. bahamensis*.

The distribution of the white coloration on the outer rectrices conforms to the Antillean type.

The following field-notes relative to the habits of *C. sharpei* have lately been communicated to me by Mr. Savage English, of the Grand Cayman Island:—Breeding season from end of December to July. There are certainly two broods, and probably three. Any sort of tree or bush is

made use of in the matter of nest-building. Mr. English has found nests in the "Lady's hair," "a most villainous plant, with leaves covered with loose stinging hairs." The nest is placed, as a rule, near the end of a branch, the materials used being vegetable fibres or grass with an intermixture of silk cotton from Asclepias seeds, and almost always some pieces of bark of the "West Indian Birch" (*Bursera gumnifera*). The nest is in the shape of a deep cup or retort, and the same material is used throughout the nest. The entrance is about halfway up from the base of the nest, and is overhung by a kind of pent. Three eggs are usually laid, pink when unblown, with dark spots—very like a Chiffchaff's.

The bird has the Wren's habit of building several nests for other reasons than egg-laying. Its food consists of small insects and the sugary secretions of the inside of flowers. The holes left in the base of the tube-shaped flowers are made by the bird's claws and not by the bill as is generally supposed. The movements of the bird generally are those of a Titmouse.

Cœreba caboti.

Certhiola caboti Baird, Am. Nat. vii., Oct. 1873, p. 612 (Cozumel Island, Yucatan; Coll. Dr. S. Cabot).

Cœreba caboti Ridgway, Birds N. & M. Amer. pt. ii. 1902, p. 404.

Hab. Island of Cozumel, Yucatan (east coast).

23 ♂♂ & ♀♀. Coll. Brit. Mus.

Wing-measurements of 10 ♂♂ average from 60–62 mm.

This bird has been described as if its nearest ally were *C. bahamensis*, and therefore surprise has been expressed that the island of Cuba (on which no *Cœreba* is found) should intervene as a remarkable gap between the distribution of these two birds. But in *C. caboti* the yellow coloration of the underparts is continued much further back and on to the flanks, gradually merging into the buffy yellow of the crissum and under tail-coverts as in *C. sharpii*. Moreover, in *C. caboti* the distribution of the white coloration on the inner and outer webs of the lateral rectrices conforms to the

arrangement characteristic of *continental* species of the genus and the ashy white of the throat is not continued nearly so far back as in *C. bahamensis*.

Unless the winter climate of Cuba is of such a nature as to negative the existence of the genus upon it, it is difficult to believe that birds carried by the trade-winds from the Bahamas could have established themselves on Cozumel (or the Caymans) without also colonising Cuba. As it is, there seem to be no records of even casual stragglers from the latter island. Indeed, in all the West Indian Islands I have never met with an alien species, and have only come across a single instance of this in records, viz., in the case of an example of *C. luteola* having been described as a new form in Grenada under the name of *C. godmani*. My impression is that in the case of this very sedentary genus the only channels by which the West Indian Islands were originally colonised was by way of ancient land-connections only.

It therefore seems more likely that *C. caboti*, *C. sharpii*, and *C. tricolor* are insular relics of a Central-American race which flourished at some period when Central America consisted of a series of large islands. Chapman (Bull. Amer. Mus. Nat. vol. iii. 1896, p. 273) states that there are "from fifteen to twenty forms peculiar to Cozumel. As might be supposed, the larger number of these are derived from the contiguous mainland (ten miles distant); but one species has no close relative nearer than Panama, another is not represented, even generically, nearer than Vera Cruz (Mexico), while several are representatives of genera peculiar to the West Indies." It seems probable therefore that Cozumel did not share in the submergences which have affected Yucatan.

Cœreba tricolor.

Certhiola tricolor Ridgway, Proc. U.S. Nat. Mus. vii., July 29, 1884, p. 178 (Old Providence Island, Caribbean Sea; Coll. U.S. Nat. Mus.).

Hab. Old Providence Island, Caribbean Sea.

3 ♂♂ & ♀♀. Coll. Brit. Mus.

The wings of two males of this very peculiar species both measured 68 mm.; bills 14 mm. In this species, therefore, and in some examples from the Bahamas we get the largest wing-measurements met with in the genus. The yellow coloration of the underparts is produced posteriorly as in *C. sharpii* and *C. caboti*, but is of a clearer lemon-yellow.

The outermost rectrices, as regards the arrangement of the white coloration, conform to the Antillean type (cf. *C. caboti*).

The greyish-white throat-patch does not extend so far down on to the thorax as in *C. bahamensis*.

Cœreba bartolemica.

Certhia bartolemica Sparrman, Mus. Carls. fasc. ii. 1788, pl. 57 (St. Bartholomew).

Cœreba bartolemica Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 419 (Islands of St. Bartholomew, St. Eustatius, Anguilla, and Saba; Lesser Antilles).

Certhiola bartolemica Sclater, Cat. Birds, vol. xi. p. 42 (Island of St. Bartholomew); P. Z. S. 1892, p. 499 (Anguilla).

Hab. St. Bartholomew, St. Martins, Anguilla, and Saba Islands (Lesser Antilles); also ? Antigua, ? Barbuda, and ? St. Eustatius Islands (Lesser Antilles).

9 adult specimens. Coll. Brit. Mus.

11 ditto (Barbuda and Antigua). Coll. Rothschild.

Owing to lack of material, our knowledge of the distribution of this species is involved in a good deal of doubt. Sparrmann described his bird "ex ins. St. Bartholemé communicavit Dnus Fahlberg." Unfortunately this was an immature specimen, to which his description and plate bear obvious testimony. In his plate this young bird is drawn without any indication of a wing-spot and with the yellow superciliary stripe extending forward to the frontal region *over and beyond the eye*. There is no indication of a frontal band of white. In his description there is also *no mention of a wing-spot*, a character upon which stress has been laid as one of the distinguishing characteristics of this species.

I have never seen an example from St. Bartholomew

Island, but judging from specimens obtained from neighbouring islands, if these are really *C. bartholemica*, the presence of a white wing-spot would appear to be an inconstant character. In this connection it may be interesting to quote Dr. Allen's remarks on a splendid series of 72 specimens of *C. chloropyga* (a wing-spotless species) from Chapada in the Matto Grosso province of Brazil (Bull. Amer. Mus. N. H. vol. iii. 1890–91, p. 348). He says: "about one specimen in ten of the adults shews a slight trace of white beyond the primary wing-covert, but only in about one in twenty is it distinct enough to readily attract attention." Possibly there is the same inconstant tendency in *C. bartolemica*, and in the normal condition the species is without a wing-spot.

As I have before remarked, it is, with the material at hand, somewhat difficult to define the limits of this species. In two specimens from Anguilla, which I have examined, the white superciliary stripe does not extend anterior to the eye; they both have conspicuous white frontal bands, and there is a small white wing-spot just visible in both. I have little doubt that Anguilla specimens can be referred to *C. bartolemica*. As regards examples from Antigua, which lies on a different submarine plateau, I have examined 12 specimens and they are all distinctly paler above and below than specimens from Dominica (19 specimens), Guadeloupe, and St. Kitts (*C. b. dominicana*). The mantle is sooty grey; wings conspicuously tipped with greyish; pileum distinct from mantle; yellow of underparts paler and clearer than in birds from Dominica; and two specimens shew slight signs of a wing-spot.

Probably these Antiguan examples are referable to *C. bartolemica*, but should they be proved to be distinct I propose the name *C. atlantica* for them. Specimens from Barbuda in the British Museum and Tring collections also agree with those from Antigua. Both Antiguan and Barbudan examples are distinguishable at a glance from examples from Dominica. It should be noted that both these islands are covered with limestone formations and

that in their geological characters they are quite distinct from the volcanic islands of Dominica and Guadeloupe.

I am doubtful of the status of the only specimen I have seen from Eustatius, but it appears to be referable to *C. bartolemica*, and is not like examples from St. Kitts and Montserrat, which agree with those from Dominica.

Regarded in the light of the geological characters of these more northern Lesser Antillean Islands and in relation to the submarine contours which surround them (*cf.* more especially papers by Spencer, Trans. Can. Instit. vol. vii. Dec. 1901), the study of the distribution of *C. bartolemica* and its subspecies *C. bartolemica dominicana* possesses considerable points of interest. A study of the distribution of the land-mollusca in these islands is also interesting in this connection (*cf.* Bland, Proc. Amer. Phil. Soc. Philad. vol. xii. p. 56, 1871).

Cœreba bartolemica dominicana.

Certhiola dominicana Taylor, Ibis, 1864, p. 167 (Dominica; Coll. P. L. Sclater.; Sclater, Cat. Birds Brit. Mus. vol. xi. p. 44 (*Hab.* Dominica, Montserrat, Antigua, and Barbuda).

Cœreba bartholemica Cory, Cat. W.I. Birds, 1892, p. 116 (St. Christopher, Nevis, Barbuda, Antigua, Guadeloupe, Dominica).

Cœreba dominicana Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 117 (Islands of Dominica, Guadeloupe, Nevis, Barbuda, and Antigua; also Anguilla, Marie Galente, Desirade, St. Christopher, and Montserrat).

25 ♂♂ & ♀♀. Coll. Brit. Mus.

12 ditto. Coll. Rothschild.

4 ditto. Coll. P. R. L.

Hab. Islands of Dominica, Guadeloupe (? Grande Terre, ? Marie Galante, ? Desirade, ? Petite Terre), Montserrat, Nevis, St. Christopher, and ? Eustatius (Lesser Antilles).

Nineteen specimens from Dominica (including the type of *C. dominicana*) and others from the islands of Montserrat and St. Christopher differ from examples from the Lesser Antillean islands further north in being darker and richer in

coloration above and below, and in lacking the light edges to the secondary wing-feathers.

When we consider the recent volcanic nature, greater humidity, and greater extent of dense and almost primæval forests which characterise the islands of Dominica and Guadeloupe, and to a less extent those of Montserrat, Nevis, and St. Kitts, the darker and richer coloration of these birds is not surprising.

Mr. Cory (Cat. W.I. Birds, 1892, p. 155) considers that Marie Galante and Desirade are inhabited by *C. bartolemica*, that is to say by the *paler* form described by Sparmann, which again is not surprising, as these islands consist of pure limestone formations similar to those of Antigua and Barbuda.

Probably the part of Guadeloupe known as Grand Terre and the small island of Petite Terre, which are also of the same limestone formations, support this pale race.

It is to be noted that in nearly every example of the nineteen specimens examined from Dominica the white eye-stripe stops short just behind or just above the eye (as in *C. bartolemica*), and that this is better noticed when the white frontal band is absent. In thirteen out of nineteen Dominican birds this frontal band was present. Birds from St. Kitts, Montserrat, Antigua, Barbuda, Anguilla, and Eustatius all shew it, so that neither the eye-stripe nor the frontal band can be considered as of any value in distinguishing the two races.

Cœreba martinicana.

Certhiola martinicana Reichenbach, Handb. d. Spec. Orn. i. 1853, p. 252, pl. 561. fig. 3824 (*ex* Brisson).

Cœreba martinicana Ridgw. Birds of N. & M. Amer. pt. ii. 1902, p. 421.

Hab. Islands of Martinique and Santa Lucia (Lesser Antilles).

15 adult specimens. Coll. Brit. Mus.

30 ditto. Coll. Rothschild.

1 ditto (S. Lucia). Coll. P. R. L.

This and the following two species are remarkable for exhibiting a more or less defined and centrally disposed patch of white on the otherwise nearly black throat.

In *C. martinicana* the coloration bears evidence of the effects of the humidity obtaining in the densely forested and mountainous islands in which it is met with.

The pileum, mantle, &c. are dark sooty black as compared with a sooty slate coloration in *C. barbadensis* and *C. uropygialis*.

The rump is olive-green and more restricted than in its nearest allies, in which the coloration is olive yellowish.

The eye-stripe in *C. martinicana* does not extend so far back as in *C. barbadensis* or *C. uropygialis* : the underparts are more tinged with olive, the yellow coloration being duller than in *C. barbadensis*, and nothing like so clear and bright as in *C. uropygialis*.

In *C. martinicana* the malar stripe of grey is absent, and the white on the throat is larger and more defined than in either of the two other allies.

Cœreba barbadensis.

[*Certhiola*] *barbadensis* Baird, Am. Nat. vii., Oct. 1873, p. 612 (Barbados, Lesser Antilles ; Coll. U.S. Nat. Mus.).

Cœreba barbadensis Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 420.

Hab. Island of Barbados.

8 adult specimens. Coll. Brit. Mus.

3 ditto. Coll. Rothschild.

7 ♂ ♂ & 6 ♀ ♀. Coll. P. R. L.

In *C. barbadensis* the coloration is lighter above and clearer and brighter yellow below than in *C. martinicana*. The rump is olive-yellow instead of olive-green ; the white of the throat-patch is smaller and the lateral rectrices are broadly tipped with white on both webs (Antillean characteristic). There is a smaller stripe of grey not seen in *C. martinicana*.

Cœreba uropygialis.

Cœreba uropygialis Berlepsch, Journ. für Orn. xl. 1892, p. 77 (Island of Curaçao, Caribbean Sea; coll. E. Peters); Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 421 (Island of Curaçao); Cory, Field Mus. Nat. Hist. Publ. no. 137, Ornith. vol. i. no. 5, pp. 202, 208, 213.

Certhiola uropygialis Hartert, Ibis, 1893, pp. 295, 312, 327.

Hab. Islands of Curaçao, Bonaire, and Aruba, D.W.I., Venezuela.

23 adults. Coll. Rothschild.

2 adults. Coll. Brit. Mus.

5 ♂♂ & 1 ♀. Coll. P. R. L.

This species, as we should expect from the arid condition and somewhat scrubby nature of the forest in Curaçao, is paler above than in *C. martinicana* (a dark sooty slate as compared with dark sooty black), but the yellow of the underparts is strikingly bright and clear. The rump is more extensively coloured than in *C. martinicana* or *C. barbadensis*, and is bright olive-yellow instead of dull olive-green. The secondaries and tertials are more or less broadly edged with light greyish, which distinguishes it from either of its two other allies. In *C. barbadensis* there is a slight indication of this.

Cœreba saccharina.

Certhiola saccharina Lawrence, Ann. N.Y. Acad. Sci. i. 1878, p. 151 (St. Vincent, Lesser Antilles; Coll. U.S. Nat. Mus.).

Cœreba saccharina Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 415 (St. Vincent and Grenada); Lowe, Ibis, 1909, p. 309.

Cœreba atrata (normal form) Austin Clark, Auk, xxiii. p. 392 (St. Vincent).

Cœreba wellsi (normal form) Austin Clark, Auk, xxiii. p. 392 (Grenada).

Hab. Islands of St. Vincent, Grenada, and the Grenadines.

2 ♂ ♂. Grenada. Coll. Brit. Mus.

4 ♂ ♂ & ♀ ♀. Grenadines. Coll. Brit. Mus.

4 ♂ ♂ & ♀ ♀ (2 juv.). Grenada. Coll. P. R. L.

With such scanty material to work on, it would be rash to speculate on the question as to whether the normally coloured birds now known as *C. saccharina* and found in the islands of St. Vincent and Grenada are of one and the same species. The fact that *C. saccharina* flourishes in the intermediately situated Grenadines seems to point to the conclusion that they are. It is to be remarked that *C. saccharina* exhibits a well-marked and constant white wing-spot, which is not a Lesser Antillean characteristic, and that the amount of white on the outer webs of the lateral rectrices is so faint (or so nearly absent) as to conform to the continental arrangement; from both of these facts it would appear probable that *C. saccharina* represents a comparatively recent invasion from the continent. It seems difficult, therefore, to believe that the two black forms of *C. saccharina* found in the islands of St. Vincent and Grenada (*C. atrata* and *C. wellsi* respectively) are melanistic phases of two different species (*cf.* Austin Clark, *loc. cit.*). In point of fact, I am unable to detect any difference between examples of *C. saccharina* inhabiting Grenada and those found in the Grenadines.

I shot four examples of *C. saccharina* on Grenada, and the late Dr. Bowdler Sharpe shot another in my presence; but I have never handled a St. Vincent specimen and have only seen one alive. The British Museum collection does not contain a specimen from St. Vincent and only one from Grenada. There is one specimen from St. Vincent in the United States National Museum and one from Grenada.

There is reason to suppose that the extreme rarity of the normally coloured form on St. Vincent (amounting now to practical extinction) is a matter of comparatively recent date.

It is so rare, too, on Grenada that Mr. Wells, a Grenada naturalist, "who lived nearly all his life on the island," had

never met with one, and the only authentic specimen that he knew of was shot in the spring of 1904 by Mr. Charles Vernet of St. George's.

Cœreba atrata.

Certhiola atrata Lawrence, Ann. N.Y. Acad. Sci. i. no. 5, 1878, p. 150 (St. Vincent).

Cœreba atrata Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 422.

Cœreba atrata (Black form) Austin Clarke, Auk, xxii. p. 393.

Hab. Island of St. Vincent, Lesser Antilles.

Measurements. Wings of 12 ♂♂ average 61–63 mm. (one 65 mm.). Bills average larger than in *C. wellsi*.

16 ♂♂ & ♀♀. Coll. Brit. Mus.

6 ♂♂ & 2 ♀♀. Coll. P. R. L.

Quite a common bird on St. Vincent. This and the next three species are melanistic phases of the normally coloured types of the genus. The explanation of their occurrence in such dominating numbers on all the four islands on which they have now been found to flourish is a problem of genetics of extreme interest. Whether these melanistic phases have arisen in quite recent times there seems to be no evidence to shew, but that they are dominant races is evident. According to Ober, the normally coloured form was once met with on St. Vincent in sufficient numbers to be noticeable.

There is no evidence whatever to enable us to say how long the black phases have inhabited the Los Testigos or the Los Roques groups of islands (see below); but bearing in mind the very recent origin of melanistic phases of British moths, noticeably in the case of *Amphidasys betularia* since 1850 (see L. Doncaster, 'The Entomologist's Record,' vol. xviii. no. 7), it is impossible to refrain from speculation as to whether these black forms of *Cœreba* have not come into existence in similarly recent times. Against this supposition is the fact that no intermediate forms have been met with, so far as I am aware. Moreover, on the two

groups of islands just mentioned, no normally coloured forms have as yet been met with.

As regards local conditions as a predisposing cause, it is only necessary to mention the totally different geological and other conditions obtaining in St. Vincent and Grenada as compared with those on the Venezuelan Islands.

Prof. Bateson informs me that he is of opinion "that it is scarcely possible that the difference (between the two forms) is brought about by loss of any factor already possessed by the type and that the black form differs from the normal in possessing one factor more. As to how a new factor comes to be added there is no evidence whatever."

Prof. Bateson goes on to add:—"The further difficulty remains, that in view of the extreme isolation of the colonies—proved by the fact that almost every island (in the West Indies) has its own type—we are driven to suppose that the assumption of the factor of black has independently come to pass on St. Vincent, Grenada, the Testigos, and Los Roques. This is a very serious difficulty; but I think it must be faced, for if a black form could have in any way travelled from the place of first origin, then such intercommunication between the islands must be supposed to be not very difficult: for at least four localities are affected. This would be incompatible with the development of such definite island forms and especially with the absence of black phases on the Grenadines."

Cœreba wellsi.

Certhiola wellsi Cory, Auk, vi. 1889, p. 219 (Grenada, Lesser Antilles; Coll. C. B. Cory).

Cœreba wellsi Ridgw. Birds N. & M. Amer. pt. ii. 1902, p. 423.

Cœreba wellsi (Black form) Austin Clarke, Auk, xxii. p. 393.

Hab. Island of Grenada, Lesser Antilles.

Measurements. Wings of 7 ♂ ♂ average from 59–61 mm. Bills average smaller than in *C. atrata*.

11 ♂ ♂ & ♀ ♀. Coll. Brit. Mus.
4 ♂ ♂ & ♀ ♀. Coll. P. R. L.
A very common bird in suitable localities on Grenada.

Cœreba lauræ.

Cœreba lauræ Lowe, Bull. B. O. C. vol. xxi. p. 108 (1908); Ibis, April 1909, p. 320; Cory, Field Mus. Nat. Hist. no. 137, Ornith. vol. i. no. 5, p. 232 (1910), "Birds of the Leeward Islands."

Hab. Los Testigos Islands, Venezuela.

4 ♂ ♂ & 5 ♀ ♀. Coll. P. R. L.

Measurements. Wings, ♂ ♂, average = 62 mm.; exposed culmen = 14·5 mm.

This is another black form of *Cœreba*. The bills of Los Testigos birds are obviously stouter and less curved than in *C. atrata* or *C. wellsi*.

There is no brightly coloured tumid rictus in fresh specimens in birds from St. Vincent and Grenada. In this connection it is interesting to note that Taylor ('Ibis,' 1864, p. 81), remarking upon *C. luteola*, which is found upon the neighbouring mainland, opposite the islands, says:—"This continental species differs from *C. flaveola*, and the other species inhabiting the Antilles, in being smaller and in *not having the prominent pink lips at the gape* which form so conspicuous a feature in them."

I have already stated in the 'Ibis' (*l. c.*) that this absence of the tumid rictus does not appear to be connected with the non-breeding season, for the generative organs of my Testigos birds were about to function.

Newton also ('Ibis,' 1859, p. 67), in discussing the bright pink rictus of the *Cœreba* on St. Croix, says:—"These are brightest in the adult, *but are also very conspicuous in the young bird*" (italics mine).

Bearing in mind Taylor's remarks about the absence of the brightly coloured tumid rictus in *C. luteola*, the point arises—is *C. lauræ* a melanistic form of *C. luteola* from the mainland?

The bird is quite common on the largest island of the group.

Cœreba lowii.

Cœreba lowii Cory, Field Mus. Nat. Hist. Publ. no. 137, Ornith. vol. i. no. 5, p. 217 (1910).

Hab. Los Roques Islands, Venezuela.

This is another melanistic variation of the normally coloured type. I have never seen a specimen. Mr. Cory (*l. c.*) says :—"Is similar to *C. wellsi*, but differs in having the back distinctly more grey than the crown, not uniform as in *C. wellsi*, and the underparts more decidedly olive-green. In the four specimens taken, the dried skins shew every indication of a tumid rictus, which does not shew at all in specimens of *C. lauræ* from Los Testigos."

No notes were taken by the collector as to the colour of the rictus in life.

Cœreba ferryi.

Cœreba ferryi Cory, Field Mus. Nat. Hist. Publ. no. 137, Ornith. vol. i. no. 5, p. 221 (1910).

Hab. Tortuga Island (east of Margarita Island), Venezuela.

Measurements of type. Wing 57·2 mm.; culmen 9·6 mm.

Mr. John Ferry procured eleven specimens of this new form which I have not had the opportunity of examining. Mr. Cory says :—"Similar in size and coloration to specimens of *C. luteola* from Margarita and coast of Venezuela, but differs in having the entire forehead and front of crown white, and the secondaries and tertials narrowly tipped with white. In the type, the frontal white patch extends upon the crown at least ·30 in. from base of upper mandible, and in none of the series is the white forehead less than ·15 in. in width." According to Mr. Ferry the species is common on the island. Many nests were found, but all empty. This was in February.

In concluding I have to express my grateful thanks to Mr. Charles Chubb for much kind help given to me in the preparation of this paper.